



Great Lakes Update

Great Lakes Data Coordination

The Great Lakes – St. Lawrence River system extends southerly and easterly from the headwaters of tributary streams in northern Minnesota and western Ontario, to the Gulf of the St. Lawrence in the Atlantic Ocean. The drainage basin, (figure 1) which includes the surrounding land and water surface, covers more than 400,000 square miles from Duluth, Minnesota in the west to Trois Rivières, Quebec on the St. Lawrence River. Eight U.S. states and two Canadian provinces border on the Great Lakes – St. Lawrence River system. The waters of this vast system of lakes and their outlet channels are shared by the United States and Canada and are the largest fresh water system in the world. Joint use of these waters requires internationally coordinated basic hydraulic and hydrology data.



Figure 1: The Great Lakes – St. Lawrence River Basin

Coordinating Committee on Basic Hydraulic and Hydrology Data

Prior to 1953, responsible Federal agencies in Canada and the United States independently collected and compiled data pertaining to the hydraulic and hydrologic characteristics of the Great Lakes and St. Lawrence River, with only superficial and informal coordination of some of the data. As a consequence, the same basic data developed on different bases and datum planes, were often not compatible. To remedy this situation, a concerted effort to study and evaluate the data used by both countries was required.

With the advent of extremely high lake levels in 1952 and the impending hydroelectric power and navigation developments in the St. Lawrence River system, Canadian and U.S. agencies recognized that continued independent development of basic data would be illogical. They realized that early agreement on the hydraulic and hydrologic characteristics of the system was of paramount importance. Therefore, the U.S. Army Corps of Engineers and the Canadian Departments of Transport, Mines and Technical Surveys and Resources and Development, opened negotiations early in 1953 for the purposes of establishing a basis for development and acceptance of identical data by both countries. The negotiations culminated in a meeting of representatives of the interested agencies in Ottawa on 7 May 1953.

At that meeting, the Coordinating Committee on Great Lakes Basic Hydraulic and Hydrologic Data was established. This committee serves in an advisory capacity to the agencies of the United States and Canada who are charged with the responsibility for collecting and compiling the Great Lakes hydraulic and hydrologic data.

Currently the Committee is made up of six members; a chairperson, member and secretary for each of the two countries. Agencies represented on the Committee include:

- U.S. Army Corps of Engineers
- National Oceanic and Atmospheric Administration
- U.S. Geological Survey
- Environment Canada
- Natural Resources Canada
- Fisheries and Oceans Canada
- Canadian Hydrographic Service

The Committee generally meets twice year.

Three subcommittees make up the inner workings of the larger body. They are the Vertical Control – Water Levels, the Hydraulics and the Hydrology subcommittees. Technical studies are performed by the subcommittees and any recommendations resulting from those studies are then passed on to the full Coordinating Committee for consideration. Sub-committee meetings are usually held a few times per year.

The roster Committee and Subcommittee members can be found at the following website.

<http://www.lre.usace.army.mil/greatlakes/hh/links/ccglbhhd/>

Vertical Control – Water Levels

Major accomplishments of the Vertical Control - Water Levels Subcommittee include the establishment of the International Great Lakes Datum (IGLD) 1955 and the revised IGLD 1985. The revision to the datum was required due to the continued effects of crustal movement, new surveying methods, and the deterioration of the zero reference point gauge location.

Additionally, vertical movement is studied to provide an estimate of the change expected between the published dynamic heights related to the IGLD 1985 and true dynamic heights continuously changing with time. This helps planning for future upgrades of the datum.

The next planned datum update will occur in 2015 and the Vertical Control – Water Levels Subcommittee will again have an active role in its development and implementation.

The Vertical Control - Water Levels Subcommittee also works extensively on water level gauging activities. The National Oceanic and Atmospheric Administration (NOAA) operates and maintains fifty-three gauges in the Great Lakes - St. Lawrence River basin; the Canadian Hydrographic Service (CHS) operates and maintains thirty-three gauges; and the U.S. Army Corps of Engineers operates and maintains eleven. Coordination on all elements required for a quality gauging station is continuous. The subcommittee has also published the "History of Water Level Gauges" for the basin. These reports document the history of the operation of water level gauges on the Great Lakes and their outflow rivers including locations, bench marks, relocations and maps.

Hydraulics

The Hydraulics Subcommittee has documented methods for conducting hydraulic field measurements. Discharge data in the connecting channels of the Great Lakes are important data elements in all studies of levels and flows. As such, consistency in the collection of these data sets is important.

Additionally, a report documenting all sites at which discharge measurements had been made in the past was completed. This report includes location maps, measurement techniques, computation methods, water level readings and tables of the actual discharges.

The Hydraulics Subcommittee also coordinates actual monthly flow values for the St. Clair, Detroit and Niagara Rivers. These are done periodically and are reported for use in further Great Lakes studies, such as the recent International Upper Great Lakes Study. Ice and weed retardation values are generally agreed upon at the same time. Hydraulic modeling methods are currently being coordinated by the subcommittee. Methodologies and standards for modeling are being agreed upon and modeling efforts are underway for all connecting channels and the St. Lawrence River.

Hydrology

The Hydrology Subcommittee spends a great deal of effort in coordinating forecasted water levels for the Great Lakes and official water level statistics. It is important that there is one coordinated information base issued to the public so there is not confusion about which set of numbers an individual should use.

The *Monthly Bulletin of Water Levels for the Great Lakes*, which accompanies this article, is a prime example of a coordinated Great Lakes product. Each month staff from the U.S. Army

Corps of Engineers in Detroit, MI and staff from the Environment Canada office in Cornwall, Ontario produce separate forecasts, using a variety of scientific methods. Prior to release, the forecasts from each office are meshed into the final product, which is then distributed to customers on both sides of the international border. The actual data values that make up the forecast bulletins are coordinated as well as the graphics and text on the document itself.

Many individual pieces of hydrometeorologic data go into the forecasting process and must also be coordinated to ensure the same base of information is being used for all work. Monthly mean water levels, outflows, precipitation and net basin supplies are all discussed. These data are also used in many Great Lakes studies.

The official datasets can be obtained by sending an email to hppm@usace.army.mil or by calling 1-888-323-2322 and selecting option 1. The Monthly Bulletin of Lake Levels for the Great Lakes can be viewed online at the following website.

<http://www.lre.usace.army.mil/greatlakes/hh/greatlakeswaterlevels/waterlevelforecasts/monthlybulletinofgreatlakeswaterlevels/>

Coordinated monthly mean water levels and hydrographs can be downloaded at this website.

<http://www.lre.usace.army.mil/greatlakes/hh/greatlakeswaterlevels/historicdata/>

Other Committee Actions

Occasionally, ad-hoc subcommittees are formed in order to accomplish certain tasks. An ad-hoc group was created to oversee the development of a consistent model to simulate the regulation and routing of outflows and levels in the Great Lakes to be used by all agencies. Another ad-hoc group had been created to assist in the updating of

coordinated physical data for the Great Lakes basin. The group looked at drainage areas, shoreline lengths, lake volume and depths and general dimensions, storage capacities and basin delineations. Many of these data themes have been analyzed in the past, but due to many new technologies, the resultant physical data from these analyses will be more accurate. Having the data available for use in a geographic information system base will also be an excellent improvement.

Reports published by the Coordinating Committee can be downloaded here.

<http://www.lre.usace.army.mil/greatlakes/hh/links/ccglbhhd/committeepublications/>

The Coordinating Committee on Great Lakes Basic Hydraulic and Hydrologic Data was created to ensure the agencies of the United States and Canada, charged with the responsibility for collecting and compiling relevant data, had a mechanism for agreeing on past and present data concerns. This has led to an excellent working arrangement between agencies in the two countries and an overall best management of the key resources of the Great Lakes basin. While the objectives of the committee and each subcommittee have experienced small changes over the years, the Committee's existence for over 50 years is a testament to necessity, acceptance and cooperation.

International Joint Commission Boards of Control Meetings

Recently, the three Great Lakes related, International Joint Commission (IJC) boards of control, held their mandated semi-annual meetings.

The International Lake Superior Board of Control met on Tuesday, August 30 in Sault Ste. Marie, MI. The minutes of this meeting as well as the

Board's Semi-Annual Report can be downloaded from the following website.

http://www.ijc.org/conseil_board/superior_lake/superior_pub.php?language=english

The Board's mandated annual meeting with the public also occurred on August 30 in Sault Ste. Marie, Michigan.

Similarly, the IJC's International St. Lawrence River Board of Control and International Niagara Board of Control held their mandated semi-annual meetings on September 13 and 14 in Quebec City, Quebec.

More information can be found at the following websites.

International St. Lawrence River Board of Control

http://www.ijc.org/conseil_board/islrbc/en/main_accueil.htm

International Niagara Board of Control

http://www.ijc.org/conseil_board/niagara/en/niagara_home_accueil.htm